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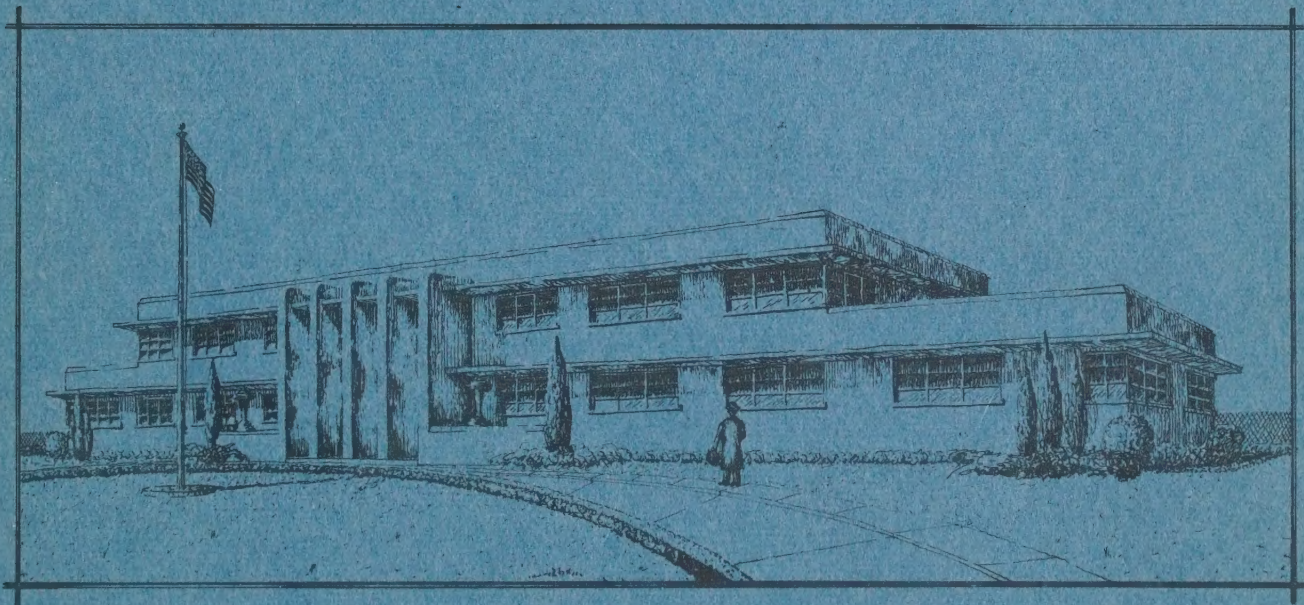
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United States Department of Agriculture  
Agricultural Research Administration  
Bureau of Animal Industry

INCREASING THE SECURITY OF THE UNITED STATES FROM  
FOOT-AND-MOUTH DISEASE THROUGH RESEARCH

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A Description of Prospective Facilities,  
Safeguards, Projects, and Services  
to the Community and the Nation



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## FOREWORD

This pamphlet is essentially a preview of plans the United States Department of Agriculture has been making to increase the security of the United States from foot-and-mouth disease, through research. The problem of such security has numerous legal, economic, technical, and safety aspects with which many persons are unfamiliar. Selection of a location for the research laboratory on a coastal island, as required by Federal legislation passed in April 1948, involves also certain engineering considerations.

Accordingly, this pamphlet considers those aspects of the problem and concludes with answers to questions most frequently raised in correspondence and discussions. The problem of foot-and-mouth disease research in the United States is new to many persons and consequently full public discussion and understanding are highly desirable.



## INCREASING THE SECURITY OF THE UNITED STATES FROM FOOT-AND-MOUTH DISEASE THROUGH RESEARCH

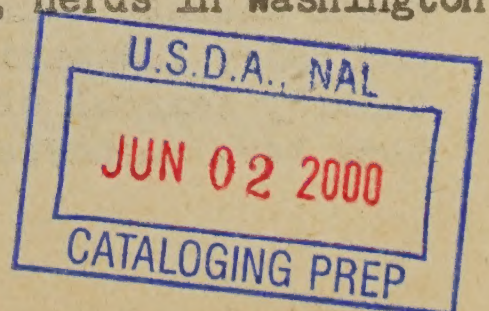
Though known for centuries to be one of the world's most far-flung and costly livestock maladies, foot-and-mouth disease has never become established in the United States. It has invaded this country nine times, six of which have been in the last half century, but each outbreak was suppressed. Since 1929 when the last occurred and was promptly eradicated, the United States has been entirely free of foot-and-mouth disease.

This infection, however, is more or less constantly present in over 50 countries of the world. Since the United States maintains extensive commerce with many of them, there is a constant risk that the disease may enter in spite of all precautions. The disease is feared partly because of the mortality it causes, but mostly because it generally leaves its victims in an impaired and unproductive condition.

The appearance of foot-and-mouth disease in central Mexico in 1946 and its continued presence there since that time has caused officials of the U. S. Department of Agriculture to re-examine the general situation in the United States from the viewpoint of more adequate security against the infection.

### Airplane Transportation Brings Danger Inland

Records of past outbreaks in the United States show that all parts of the country are in potential danger. More than half the outbreaks affected livestock in the New England and Eastern States. The outbreak of 1914 extended to 22 States largely in the north central and north eastern parts of the country but that outbreak included, also, herds in Washington,





Montana, Kansas, and Kentucky. Outbreaks in California in 1924 and 1929, and an outbreak in Texas in 1924, were confined to those States.

In the past the usual points at which the infection entered the United States were seaboard ports, but modern airplane transportation now makes inland areas also vulnerable. Thus far the enforcement of rigid quarantine regulations, based on Federal and State statutes, has been the main means of defense. The research studies here described should materially strengthen those defenses and other security measures.

#### Possible Losses Faced by United States

The average cost of eradicating each of the few outbreaks that have occurred in the United States has been less than \$4,000,000. By contrast, vastly greater losses occur repeatedly, in much smaller countries where the disease is well established. If foot-and-mouth disease should become established in the United States, its presence would probably cost this country fully \$200,000,000 a year, judging from reliably reported losses that it causes abroad and the toll that less serious diseases take in our own country. In terms of reduced supplies of meat and milk, a conservative estimate of the loss would be fully 10 percent of normal production. Clearly the United States cannot afford to incur such curtailment of its basic foods, not to mention reduced production of hides, wool, and many other animal products.

#### Livestock Industry Cooperative in Security Measures

In view of the extensive losses that foot-and-mouth disease causes abroad, the livestock, meat, and dairy industries of the United States are particularly fearful of it. Accordingly, for many years they have supported the efforts of veterinary and



law-making officials to develop the best methods of reducing the danger. In response to public sentiment, often forcibly expressed, Federal and State legislative bodies have assigned to their chief veterinary agencies the main responsibility of preventing the disease if possible and eradicating it in case of outbreaks. For the United States Government, the agency is the Bureau of Animal Industry of the U. S. Department of Agriculture. For the various States, the agency is usually the State livestock sanitary board, State veterinarian, or veterinary branch of the State Department of Agriculture.

Because of the great issues at stake, involving the national welfare, the Bureau of Animal Industry has sought to keep not only the livestock and related industries but also the United States public fully informed of the nature of foot-and-mouth disease, the losses it causes, and methods being used to protect this country against it. The welfare of all the people, as well as that of the livestock interests is concerned because the disease is a definite menace to the food supply.

#### United States Scientifically Indebted to Foreign Countries

Practically all scientific knowledge gained in the past on this disease has resulted from research in foreign laboratories. This is because of a previous, long-standing public policy not to experiment in the United States with the virus of the disease. Scientifically, this country is therefore deeply indebted to foreign countries, chiefly in Europe, for present knowledge of foot-and-mouth disease and means of detecting and combating it.



### Advisory Committees Urge Research

In recent years, during which foot-and-mouth disease has been present in Mexico -- constituting a closer approach of the infection than usual -- the Bureau has had the benefit of recommendations from two advisory committees. One of these represents interests concerned with commercial livestock production and the other the research point of view. The members of both are prominent in their respective fields.

After considering all aspects of national security against foot-and-mouth disease the two committees mentioned above recommended that the Bureau of Animal Industry conduct full-scale research on foot-and-mouth disease. The research advisory committee recommended that authority be sought from Congress to conduct such research in the United States, subject to necessary safeguards, and the Bureau acted accordingly. The experience of several foreign laboratory directors who have worked with the disease has shown that, with modern safeguards, such research can be conducted with complete safety to livestock near the laboratory. In addition the foreign authorities have pointed out the advantages of such a research institution to any country now lacking one. For instance, Dr. Georges A. Moosbrugger, director of the Swiss Federal Vaccine Institute, Basel, Switzerland, in commenting on scientific research as a weapon against foot-and-mouth disease, declared that problems constantly turn up that make necessary the presence of a laboratory. He emphasized that, "Only the countries that have a research institute in constant activity can consider themselves ready for the fight."

After hearings, at which extensive testimony was taken, Congress passed and the President approved, in April 1948, Public Law 496 authorizing the establishment of a foot-and-mouth disease



research laboratory on a coastal island separated from the mainland by deep navigable water. The Bureau developed preliminary plans for getting the project under way, obtained data on the suitability of the coastal islands of the United States and requested appropriation of the necessary funds. When Congress adjourned in June, 1948, study of the request had not been completed.

### Benefits to United States and the Community

In their consideration of possible sites the Bureau's officials, aided by engineers, architects, and other technical experts, examined many detailed maps, showing the size, elevation, and other physical characteristics of islands on both the Atlantic and Pacific coasts and in the Gulf of Mexico. In addition the officials visited several of the more promising locations to obtain detailed information at first hand. On these visits it became apparent that some persons living within the general area of the laboratory sites under consideration were unfamiliar with the local and national benefits that such an institution would bring and had needless apprehensions, based largely on fear of the disease.

The principal benefit to the community, as well as to the Nation, is the greater security such a laboratory would bring, especially in time of emergency. As already pointed out, past outbreaks of the disease have affected practically all parts of the United States. Since prompt diagnosis of foot-and-mouth disease is one of the greatest elements in its prompt eradication, the presence in a community of the laboratory and a skilled staff would practically assure an early recognition of that or any related strange disease. That benefit alone represents valuable protection to the livestock of any community.



In addition, besides serving the entire country through the research conducted, such an institution contributes materially to the economic and cultural life of the community in which it is placed.

The probable cost of the buildings and research facilities will be about \$30,000,000 and yearly operating expenses, including salaries of employees, approximately \$3,000,000. Much of this money will be spent locally.

The laboratory will use several thousand cattle and other animals a year, thus providing a convenient local market for animals raised in the surrounding area.

Since the laboratory is to be the largest and most complete of its kind in the world, its presence would add prestige to any area selected as its site.

The staff of workers is expected to be about 400. Many of these will be highly trained scientists who, together with their families, will contribute to the cultural life of the community. The laboratory also will provide employment to considerable numbers of office workers, mechanics, electricians, and other groups, most of whom are likely to be local persons.

The laboratory will be attractively designed, well landscaped, and otherwise an asset to any community. The engineers and architects give assurances against nuisances such as smoke, odors, pollution, and noise.

#### Safety Features of Research Laboratory

Though present plans are likely to undergo certain changes as they are perfected, officials who will supervise the research have made provision for safety



features that give assurance of complete control over the virus of the disease at all times. Foreign scientists who have examined the plans regard the safety features as more complete than those of their own laboratories from which no escape of the virus has ever occurred.

#### Research to be Conducted Within Walled Compound

All the research is to be conducted in specially constructed buildings within a compound of about 30 acres, approximately in the center of a 500-acre tract. To help insure the necessary insulation, the compound will be surrounded by a high wall of reinforced concrete extending far enough into the ground to make it rodent-proof.

The wall will have but two entrances into the inner compound. Every person who enters it must first pass through an outer locker room where all street clothing will be left. Then he will put on previously sterilized laboratory clothing. Before leaving any unit within the compound he must take a shower bath, and change to clean clothes. Only healthy animals will be brought to the island, and deliveries of stock and equipment will be made exclusively with trucks of the laboratory. All experimental animals will be disposed of within the compound; the carcasses will either be incinerated or sterilized by steam under pressure.

#### Experimental Animals Sealed from Outer World

Once inside the compound the animals will be kept constantly within specially constructed buildings sealed away from the outer world. This means that the compound will contain no pastures or open lots where the animals might have contact with other livestock, birds, insects, or even the open air. The main structures within the compound are to be a



central laboratory building; 48 isolation laboratory buildings for research with large animals; 2 buildings for the preparation and storage of feed; a building for the cleaning and sterilization of clothing; steam sterilizing and incinerator units, sewage and waste sterilization and disposal; facilities for air sterilization, heat, and ventilation; a cafeteria; guard shelters; maintenance and repair shops; and a system of enclosed passageways. The plans include many features gleaned from the experience of foreign scientists who have conducted research on foot-and-mouth disease for many years.

### Structures Inside the Compound

The central laboratory is to be well equipped for biochemical, physical, and other studies of viruses and virus diseases. Construction and safety features include sealed exterior windows, smooth non-porous interior walls, and sterilization of all outgoing air.

Besides the space devoted to research the buildings will include offices, dressing rooms, guard stations, and facilities for the complete sanitary control of all personnel and materials entering or leaving the compound area.

The 48 isolation laboratory buildings for research with large animals will each house approximately 50 head. These structures are to be two stories high. The animals will be on the first floor; the second floor, which will be a disease-free area, is to be entirely sealed from the first. All mechanical equipment, including that used for air sterilization, ventilation, and heating, will be on the second floor, together with feed hoppers and windows for observation of the animals below.

The two buildings for the preparation and storage of feed are likewise to be within the compound. They



will contain additional safeguards to exclude rodents and other possible disturbing influences.

The building for the cleaning and sterilization of clothing will be connected with the dressing rooms and wash rooms of the laboratory buildings.

The sterilizing and incinerator units are to be used for disposing of all debris and refuse. Proposed plans call for the installation of a sufficient number of these units to serve the isolation laboratory buildings to which they will be connected by enclosed passageways. Additional incinerators are to be provided for the central laboratory, cafeteria, and other buildings requiring them.

All sewage within the compound area will undergo complete sterilization and other treatment to render it harmless to all forms of life, both animal and vegetable.

A series of passageways, two stories high, will connect buildings and areas within the compound. The first floor of the passageway will be used by personnel and for the movement of animals. The construction of the passageway will be of reinforced concrete and glass brick to permit ready disinfection of inside exposed surfaces.

The second floor of each passageway, like the second floor rooms, will be a disease-free area, entirely sealed from the first. Its chief uses will be for feed distribution and observation and maintenance of mechanical equipment installed in buildings connected by the passageways.

The distribution of air in buildings, passageways, and enclosed areas within the compound will be completely controlled, mechanically. The air will not be recirculated and it will be sterilized before its discharge to the outside.



### Structures and Facilities Outside the Compound

The structures outside the compound will not be exposed to the virus of the disease, and consequently the system of control over them and persons using them will not need to be so meticulous as for operations within the compound.

A headquarters building will contain office space, conference rooms, a scientific library, and other administrative facilities. There will also be several one-story barns of conventional type for housing the healthy animals brought to the island until they are removed to the compound and used for experimental purposes. A few buildings of moderate size will be provided for the housing and breeding of small animals such as guinea pigs, rabbits, rats, mice, and hamsters for use in laboratory experiments.

Other structures outside the compound are to be a feed-storage building, a garage, a small firehouse, fuel storage for the incinerator units, dormitories for men and women, and a few residences for key personnel whose duties require them to live close to their work. Still other facilities include concrete roads, steam and utility tunnels, sewers, a supply of bottled gas, and other necessary utilities.

### Staff of About 400 Persons

Of approximately 400 persons who will operate the research laboratory and facilities, about 50 are to be highly trained scientists, assisted by approximately the same number of technicians. In addition to the scientific staff, about 200 employees will be assigned to the care of the animals. The remaining employees will operate the mechanical equipment or perform maintenance, guard, clerical, or other duties. All employees will be carefully chosen, indoctrinated with the types of research conducted, and instructed in the



relation of their specific work to it. Officials of the Bureau of Animal Industry emphasize that foot-and-mouth disease affects cloven-footed animals. People are only rarely affected and then only mildly. Consequently the disease is of no importance from a public-health standpoint.

#### Broad Research Program Planned

The research to be conducted at the laboratory will cover a wide range of subjects on which more information than now exists is needed. The principal projects planned are:

Fundamental research on the virus of foot-and-mouth disease, including its physical, chemical, and biological properties and its relation to other viruses.

Studies on modes of transmission of the virus, including the possibilities of carrier animals.

The development of improved diagnostic methods.

Studies of the different strains of the virus and their relation to one another.

Development of more effective and less expensive vaccine.

Search for improved methods of disinfecting contaminated premises and materials.

#### Approval of Agricultural Organizations

Officials of the Department already have received endorsement of the proposed research from many influential national and regional organizations, urging that selection of a site be made promptly so that construction may proceed and the research begin.



Many requests for information about the proposed laboratory have been received. Some of the questions asked, and their answers, follow.

Question: Why not establish the laboratory on some remote island far away from established communities?

Answer: For a laboratory of this kind it is desirable to choose a locality where livestock can be readily obtained from nearby areas for experimental needs and where climatic conditions are similar to those under which the animals are normally raised. In addition the site should preferably be one that can be well protected in case of war or other emergency. A further need is accessibility to other research institutions to facilitate scientific consultations. There are still other reasons, among which is accessibility to schools, churches, stores, and other elements of normal community life in order to secure and retain qualified personnel, most of whom will have families. A primary essential is an ample water supply, which is often inadequate.

Question: Would the presence of the laboratory interfere in any way with residents of the island who have homes or summer cottages on the island?

Answer: No.

Question: What about ferry service? If service already existed would it be improved? And if there were no regular service, would it be established?



Answer: Since several hundred persons employed by the laboratory would need transportation, existing ferry service would be improved, or, if no such service existed, it would need to be established. From the Department's standpoint, any transportation service used by its employees would be available also to other residents of the island on a cost basis.

Question: Would such a laboratory tend to raise or lower real estate values?

Answer: The presence of Government facilities, with the opportunity for regular employment at good wages, generally tends to make adjacent and nearby property more valuable.

Question: Is there a likelihood that such a laboratory would eventually need more land?

Answer: Very little likelihood; present plans provide for a site that should be ample for the foreseeable future.

Question: Is there a chance that dogs and cats or birds might get or carry the infection?

Answer: None whatever. Birds, dogs, and cats do not get this disease, as to their carrying the disease, if they get into the compound, they could not get into the sealed buildings where all work with the virus is to be done, and therefore could have no contact with it.

Question: Would there be bad odors from the incinerators?



Answer: The sanitary engineers give assurance that none would exist, and they cite the satisfactory use of such equipment close to residential areas in large cities. Many of the people are not even aware that incinerators are nearby when such installations are properly built and maintained, as would be the case with the research laboratory.

Question: Wouldn't the Federal use of land for the laboratory deprive the community of needed income from taxes.

Answer: The taxes lost would be compensated for many times through added income to the citizens of the community.

Question: About how many and what kind of animals is the laboratory likely to purchase?

Answer: Probably between 1,000 and 2,000 a year. The principal need will be for young cattle. All animals purchased must be normal and healthy.

Question: What assurance is there against accident or the carelessness of some laboratory employee that might permit the escape of the infection -- to the detriment of nearby livestock?

Answer: The construction of the laboratory buildings, together with maintenance of a guard service, make the escape of infection through accident or carelessness a practical impossibility. The British research laboratory at Pirbright, England, lacks several of the safeguards to be provided in the United States laboratory. Moreover,



the British institution is surrounded by well-developed livestock farms and is within about 60 miles from the metropolitan center, London. Yet no infection has ever escaped from that laboratory. With the additional safeguards that the United States research laboratory will have, plus its location on an island, there is no reasonable basis for fear or apprehension concerning any danger to livestock or anything else from this laboratory.

**Question:** Does foot-and-mouth disease sometimes affect people?

**Answer:** Though a few rare instances of human infection have been reported from countries where the disease is prevalent among livestock, the cases are so unusual and the effects so mild that foot-and-mouth disease is regarded by medical authorities to be a disease only of animals having divided hoofs. Man and other animals are practically never affected.

**Question:** Why should the United States be so apprehensive about foot-and-mouth disease when practically all other countries, though long infected, have learned to "live" with the disease?

**Answer:** Most other countries are living with the disease from necessity and not from choice. Many qualified observers question whether some branches of our livestock industry could survive if the disease were to become established in this country.

**Question:** How will a laboratory for research on foot-and-mouth disease help to protect the country against the infection?

**Answer:** Through developing new knowledge of the disease whereby its introduction may be more fully protected against, and to combat the disease better if it should gain entrance.



Question: Why not carry out the research program in some other country where the disease is prevalent?

Answer: The combined facilities existing elsewhere are inadequate for a comprehensive, sustained program of research on foot-and-mouth disease. A temporary, short-term program of cooperative research is being carried out now to the extent possible between existing foreign laboratories and U. S. Bureau of Animal Industry. But such arrangements cannot be depended upon with certainty over a long period of time. Moreover the livestock industry and the general public of the United States deserve a unified and comprehensive research program under one direction; free from international complications that might result from war, changes in government, or other major influences affecting the countries concerned.

Question: Would the laboratory be available for investigation of other animal diseases in case of need?

Answer: Yes. The primary purpose of the laboratory is to provide safe facilities for research on foot-and-mouth disease, but its safety features would be adaptable for research on other diseases, "which in the opinion of the Secretary constitute a threat to the livestock industry of the United States."

Any further question may be addressed to the Bureau of Animal Industry, U. S. Department of Agriculture, Washington 25, D. C.



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